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Dark Group: Dark Energy and Dark MatterA. de la Macorra Instituto de Física, UNAM Apdo. Postal 20-364, 01000 México D.F., México

abstract

We study the possibility that a dark group, a gauge group with particles interacting with the standard model particles only via gravity, is responsible for containing the dark energy and dark matter required by present day observations. We show that it is indeed possible and we determine the constrains for the dark group.

The non-perturbative effects generated by a strong gauge coupling constant can de determined and a inverse power law scalar potential IPL for the dark meson fields is generated parameterizing the dark energy. On the other hand it is the massive particles, e.g. dark baryons, of the dark gauge group that give the corresponding dark matter. The mass of the dark particles is of the order of the condensation scale Λ_c and the temperature is smaller then the photon's temperature. The dark matter is of the warm matter type. The only parameters of the model are the number of particles of the dark group. The allowed values of the different parameters are severely restricted. The dark group energy density at Λ_c must be $\Omega_{DGc} \leq 0.17$ and the evolution and acceptable values of dark matter and dark energy leads to a constrain of Λ_c and the IPL parameter n giving $0.21\, eV \leq \Lambda_c \leq 3645\, eV$ and $0.28 \leq n \leq 1.04$.